ALABAMA

DEPARTMENT OF TRANSPORTATION

GUIDELINES FOR OPERATION

SUBJECT: COUNTY BRIDGE PROJECTS USING PRECAST MEMBERS AND PILE BENT CONSTRUCTION

Precast bridges are intended for use on the State's County Road system only. Precast bridges are not for use on curved or skewed alignments or if the bridge is to be constructed on grade or in vertical curvature. Precast bridges shall be constructed in normal crown using a 3/16" per foot slope from centerline in accordance with the Precast Bridge Standard Drawings.

General Design Requirements

Precast bridges shall be designed in accordance with the AASHTO Standard Specifications for Highway Bridges, 17th Edition and latest interims, and the latest ALDOT Construction Specifications unless otherwise noted in this guideline. Live Load used in design shall be HS20-44. No future wearing surface dead load is to be considered in the design since overlaying of the bridge deck units with asphalt, concrete, etc. is not allowed.

The 25 year flood event shall be used in establishing finished grade. A minimum of 2 feet of freeboard shall be provided above the 25 year stage elevation in determining the low chord elevation. For foundation design, minimum factor of safety of 2.0 shall be provided for the unscoured condition and a minimum factor of safety of 1.10 shall be provided for the maximum scour event.

Foundation Investigation

Subsurface information shall be collected in general accordance with AASHTO R 13. Penetration tests ("N"-blow count) and split-barrel sampling shall be performed as given in AASHTO T 206. If auger refusal is reached within 20 feet of the drilling surface, coring below auger refusal elevation will be required. Cores shall be taken to a depth of 10 feet below auger refusal elevation in order to determine (1) the character of the non-augerable material and (2) if pile bents using pre-drilled pilot holes are a viable design or if an alternative foundation design should be considered.

A minimum of one boring per every three spans and one boring at each abutment shall be provided to determine soil types, soil layer thicknesses, and "N" (blow count) values. At least one boring shall be taken in or adjacent to the stream for the purpose of collecting soil samples to determine D50 values. D50 values shall be determined in accordance with ALDOT 442. Additional borings, testing and analyses such as settlement analysis may be necessary depending on geological site conditions and the presence of soft soils in the abutment area. (See Attachment "A")

If the County's Transportation Department has historical information on the existing bridge which includes sufficient engineering data regarding the subsurface conditions, then the county may simply gather D50 data from the streambed in order to calculate the anticipated scour depths. Sufficient engineering data would be defined as geotechnical borings with SPT-N values and soil descriptions for every five feet of penetration for the depth of the hole. The borings need to cover the entire bridge site and not be limited to a single location.

Scour

All precast bridges shall be designed for scour in accordance with FHWA's Hydraulic Engineering Circular No. 18 (HEC-18), Evaluating Scour at Bridges, 4th Edition.

Minimum Pile Size Requirements

The Department's Precast Standard Drawings are based on a minimum pile section of HP 12x53 for abutment piles and bent piles as well as wing and anchor piles. Design parameters satisfying this pile section are noted on the Precast Standard Drawings. The Designer of Record is responsible for determining the actual pile size requirements and any additional strengthening (bracing, encasements, etc.) that may be required when design parameters noted on the standard drawings are exceeded.

Pile Driving Requirements

All abutment piles, bent piles, and abutment anchor piles shall be installed in accordance with Section 505 of the Standard Specifications.

Wing piles shall be driven to refusal or 20', whichever is less. The minimum penetration for wing piles shall not be less than 10 feet into natural ground.

Test Piles and Loading Tests

Test piles and loading tests shall be provided in accordance with Section 505 of the Standard Specifications and as noted on the contract drawings.

Foundation Report

A foundation report, prepared by a licensed geotechnical engineer, shall be submitted on each project. The report, at a minimum, shall consist of an evaluation of the pile type that is recommended with a discussion of pile types considered and reason for not recommending. If drill shafts are the preferred foundation, then information on construction technique (wet/dry) shall be specified. The consultant shall make recommendations on pile/shaft tip elevations, minimum tips (where scour is considered), and estimated pile/shaft tips. The report shall also include recommendations on load test to include the number and location of each recommended test. Any unusual conditions or circumstances which could impact the foundation should be discussed. The report shall also include an evaluation of the approach fill to determine the amount of settlement and impacts on the bridge abutment.

Guideline Exceptions

All exceptions to this guideline shall have prior approval of the State Bridge Engineer.

RECOMMENDED FOR APPROVAL: _____
BRIDGE ENGINEER

APPROVAL: _____
ACTING CHIEF ENGINEER

APPROVAL: _____ 8/1/12
TRANSPORTATION DIRECTOR DATE